

# MONTHLY WEATHER REVIEW.

Editor: Prof. CLEVELAND ABBE. Assistant Editor: FRANK OWEN STETSON.

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## INTRODUCTION.

The present summary for 1905 is based essentially upon data received from about 166 regular Weather Bureau stations, 33 regular Canadian stations, and from such climate and crop sections as have forwarded their annual summaries in time.

The statistical tables and charts have been prepared under the supervision of Mr. W. B. Stockman, Chief, Division of Meteorological Records, and the summary of flood movements by Dr. H. C. Frankenfield, Professor of Meteorology.

## FORECAST DIVISION.

Prof. E. B. GARRIOTT, in charge.

### RIVER AND FLOOD SERVICE.

With but few exceptions the floods of the year were of moderate character and were not attended by any considerable loss or damage. A few were quite serious, especially in the Grand River Valley of Michigan, and in New Mexico and Arizona. Detailed accounts of the various floods will be found in the Weather Reviews for the appropriate months. The principal ones were as follows: That of the Sacramento River in January; the southeastern rivers in February; the upper Ohio River in March; the lower Ohio and lower Mississippi rivers and their tributaries, the Red, the rivers of Texas and the upper Rio Grande in May; the upper Mississippi, the Grand River of Michigan, the Red, and the rivers of New Mexico and eastern Colorado in June; the Missouri and upper Mississippi rivers and their tributaries, the Pecos, Red, White, and Black rivers of the southwest, the James River of Virginia and the rivers of the Carolinas in July; the local floods in southeastern Pennsylvania in August; the lower Missouri and middle Mississippi rivers in September, a very unusual occurrence; and the rivers of Arizona in November. While none of these floods were attended by loss of life or great loss of property, yet the aggregate losses amounted to several millions of dollars.

With but one or two comparatively unimportant exceptions the floods were forecast at the proper times and with the usual accuracy.

The following changes were made in the river and flood districts:

#### NEW DISTRICTS ESTABLISHED.

Concord, N. H., for the Merrimac River.

Denver, Colo., for the rivers of Colorado, Wyoming, Utah, Arizona, and New Mexico.

Hartford, Conn., for the Connecticut and Housatonic rivers.

Moorhead, Minn., for the Red River of the North.

Portland, Me., for the rivers of Maine.

#### DISTRICT ABOLISHED.

Boston, Mass. This territory was divided between the stations at Portland, Me., Concord, N. H., and Hartford, Conn., as stated above.

There is now a regular Weather Bureau station at Peoria, Ill., instead of a special river station, and daily river observations were also begun at the regular stations at El Paso, Tex., La Salle, Ill., Pueblo, Colo., and Roswell, N. Mex. (Hondo River). The name of the special river station at Montague, Me., was changed to West Enfield, and that of the special rainfall station at Rocky Mount, N. C., to Battleboro.

Special river and rainfall stations were established and discontinued during the year as shown in the subjoined statement:

#### RIVER STATIONS ESTABLISHED.

<i>Station.</i>	<i>District.</i>
Albuquerque, N. Mex.	Denver, Colo.
Barton, Oreg.	Portland, Oreg.
Beatrice, Nebr.	Kansas City, Mo.
Beverly, Ohio.	Columbus, Ohio.
Billings, Mont.	Sioux City, Iowa.
Blair, S. C.	Charleston, S. C.
Carlsbad, N. Mex.	Denver, Colo.
Chappel, S. C.	Charleston, S. C.
Espanola, N. Mex.	Denver, Colo.
Florence, Colo.	Denver, Colo.
Fountain, Colo.	Denver, Colo.
Franklin, Pa.	Pittsburg, Pa.
Greenville, N. C.	Raleigh, N. C.
Higbee, Colo.	Denver, Colo.
Kennett, Cal.	San Francisco, Cal.
Las Animas, Colo.	Denver, Colo.
Logan, N. Mex.	Denver, Colo.
Lowell, Mich.	Grand Rapids, Mich.
Moncure, N. C.	Raleigh, N. C.
Musselshell, Mont.	Sioux City, Iowa.
Nepesta, Colo.	Denver, Colo.
Oakdale, Ga.	Atlanta, Ga.
Pecos, Tex.	Denver, Colo.
Pine Bluff, Ark.	Little Rock, Ark.
Renovo, Pa.	Harrisburg, Pa.
Rincon, N. Mex.	Denver, Colo.
Roswell, N. Mex. (Hondo River).	Denver, Colo.
Rousseau, S. Dak.	Sioux City, Iowa.
Salida, Colo.	Denver, Colo.
San Marcial, N. Mex.	Denver, Colo.
Savannah, Tenn.	Cairo, Ill.
Tarboro, N. C.	Raleigh, N. C.
Trinidad, Colo.	Denver, Colo.
Waldo, N. Mex.	Denver, Colo.
Wolf Point, Mont.	Sioux City, Iowa.

#### RIVER STATIONS DISCONTINUED.

<i>Station.</i>	<i>District.</i>
Lockhaven, Pa.	Harrisburg, Pa.
Oil City, Pa.	Pittsburg, Pa.
Rotherwood, Tenn.	Knoxville, Tenn.
St. Cloud, Minn.	Minneapolis, Minn.

#### RAINFALL STATIONS ESTABLISHED.

<i>Station.</i>	<i>District.</i>
Abercrombie, N. Dak.	Moorhead, Minn.
Caledonia, N. Dak.	Moorhead, Minn.
Colorado Springs, Colo.	Denver, Colo.
Crookston, Minn.	Moorhead, Minn.
Drayton, N. Dak.	Moorhead, Minn.
Eureka Springs, Ark.	Little Rock, Ark.
Fergus Falls, Minn.	Moorhead, Minn.
Fort Stanton, N. Mex.	Denver, Colo.
Grand Forks, N. Dak.	Moorhead, Minn.
Las Vegas, N. Mex.	Denver, Colo.
Maxwell City, N. Mex.	Denver, Colo.
Olden, Mo.	Little Rock, Ark.
Oregon, Ark.	Little Rock, Ark.
Pembina, N. Dak.	Moorhead, Minn.
Raton, N. Mex.	Denver, Colo.
Santa Rosa, N. Mex.	Denver, Colo.

## RAINFALL STATIONS ESTABLISHED—Continued.

Station.	District.
Shoemaker, N. Mex.	Denver, Colo.
Springer, N. Mex.	Denver, Colo.
Stonewall, Colo.	Denver, Colo.
Summit, Cal.	San Francisco, Cal.
Tercio, Colo.	Denver, Colo.
Thornton, N. Mex.	Denver, Colo.
Tucumcari, N. Mex.	Denver, Colo.
Wahpeton, N. Dak.	Moorhead, Minn.
Westcliffe, Colo.	Denver, Colo.

## RAINFALL STATIONS DISCONTINUED.

Station.	District.
Covington, Va.	Richmond, Va.
Kineo, Me.	Portland, Me.
Moncure, N. C.	Raleigh, N. C.
Oriskany, Va.	Richmond, Va.
Ottawa, Ill.	St. Louis, Mo.
Verbenia, Ala.	Montgomery, Ala.

The highest and lowest stages for the year, together with the annual ranges at 249 selected stations, are shown in Table V.—*H. C. Frankenfield, Professor of Meteorology.*

## REPORT OF THE CHIEF OF THE WEATHER BUREAU FOR THE FISCAL YEAR ENDING JUNE 30, 1905.

[Dated July 28. Extract from the report of the Secretary of Agriculture, October, 1905.]

I have the honor to submit a report of the operations of the Weather Bureau during the fiscal year that ended June 30, 1905.

### REVIEW OF TEN YEARS' WORK.

The present Chief of the Weather Bureau completed ten years of service as such on July 4, 1905, having served previous to his appointment as Chief of the service nineteen years in the various subordinate grades. It may, therefore, not be inappropriate at the end of this decade to make a brief survey of the development of the weather service during his administration.

It is probable that there is no part of the Government service in which rigid discipline is more necessary to its well-being than in the United States Weather Bureau. It has to do with the saving of life and property. While its observations are made with scientific precision, yet its warnings of danger from floods, from gales, or from frigid air, are the results of empirical reasoning, and, therefore, even with favoritism eliminated from its personnel, and with the maintenance of the highest form of the merit system of appointment, promotion, and preferment, there will still be a small percentage of error in its warnings. The public is entitled to know, however, that it is only by the maintenance of a high standard of official integrity that the percentage of error is reduced to and kept at a low figure.

The following statement of appropriations, disbursements, and unexpended balances, from July 1, 1895, to June 30, 1905, ten years, shows that the average per annum increase in the appropriations for the support of the Weather Bureau has only been 4.41 per cent; that during three years of this period there was an actual decrease in the appropriations and that during no year was there a deficit, but that each year a considerable sum of money—in one case amounting to over \$71,000, in another to \$13,000, in another to over \$9,000, and in still another to over \$8,000—was returned to the Treasury as unexpended balance.

*Appropriations, disbursements, and unexpended balances from July 1, 1895, to July 1, 1905.*

Fiscal year.	Amount appropriated.	Amount disbursed.	Amount unexpended.	Per cent of increase in appropriations.
1896.....	\$885,610.00	\$814,584.17	\$71,145.30	0.82
1897.....	883,772.00	870,581.46	13,190.54	+0.21
1898.....	883,702.00	877,838.35	5,863.65	+0.01
1899.....	1,015,502.00	1,007,962.92	9,539.08	14.91
1900.....	1,022,482.00	1,014,238.50	8,243.20	0.68
1901.....	1,058,320.00	1,052,626.99	5,693.01	3.51
1902.....	1,148,320.00	1,146,769.16	1,550.84	8.50
1903.....	1,263,760.00	1,256,752.90	7,007.10	10.05
1904.....	1,248,520.00	1,245,653.51	2,866.19	+1.21
1905.....	1,337,740.00	*1,336,198.58	*1,541.42	7.14

\*Estimated. †Decrease.

Again referring to the fact that the average per annum increase in the cost of the weather service during the past ten years is only 4.41 per cent, it is significant, as showing the

benefit to the weather service of a determination to apply the spirit as well as the letter of the civil service law, that the daily distribution of forecasts and warnings, or of printed charts containing the daily meteorological data of the United States, has increased from 22,582 to 622,880 copies, of which 158,000 represent printed reports.

The frequently expressed opinions of persons who represent the important interests that the Weather Bureau was created to serve, show that it has made such progress in its internal discipline and in the results accomplished for the benefit of the farmer, the mariner, the shipper, the manufacturer, and the seeker after health or pleasure, that there is no weather service anywhere in the world comparable with it. It has received the commendation of citizens of this country as well as the encomiums of scientists both at home and abroad, many of whom come here to study its organization. In recent years its stations have been equipped with standard instruments, apparatus, and furnishings of the latest design; daily maps are printed at nearly 100 of its local stations; large glass maps, containing the current weather reports, are exhibited each morning before important commercial associations; maps, either neatly printed or milleographed, are distributed within three hours from the time that the observations are made. Climatic statistics for the various States are collected from nearly 4,000 voluntary observers using standard instruments, and printed in the form of monthly section reports, so that the climate of one region can be readily compared with that of another. The Bureau has extended its network of stations around the Caribbean Sea and the Gulf of Mexico, so that no destructive tropical storm may come without warning. It has established stations in Bermuda and in the Bahamas, and arranged for cable cooperation in the Azores and along the western coast of Europe, which enables it to make forecasts for two or three days in advance for steamers leaving this country, and to warn steamers leaving Europe for America of severe storms which they may encounter on their westward voyage. With kites and mountain stations it has explored the upper air and gained useful knowledge. It has conducted experiments in wireless, or space, telegraphy, and developed one of the best wireless systems now in use. It has extended its system of telegraphic and climatic observations so that now, except in some portions of the Rocky Mountain States, the temperature and rainfall conditions of nearly every county can be ascertained; these observations are of great benefit in the development of the arid and subarid regions, especially in the organization of the extensive irrigation works recently authorized by Congress.

The Weather Bureau has developed and put into effect a fair, yet rigid, discipline for the control of its personnel—a system of merit in which each person works out his own status to such an extent that it is practically impossible for an incompetent or undeserving person, or a person lacking in good character, to reach any important post of duty. With this discipline there is associated a system of study and examination which develops the intellectuality of those who receive advancement. With